5814-A PREMIUM TYPE

5814-A

MEDIUM-MU TWIN TRIODE

9-PIN MINIATURE TYPE

Intended for applications where dependable performance under shock and vibration is paramount. The 5814-A, a "premium" version of the 12AU7, supersedes type 5814.

GENERAL DATA

Electrical:

Heater, for Unipotential Cathodes:

	Series	*Parallel*	
Heater arrangement	*Series*	*Parallel*	
Voltage	12.6 ± 10%	6.3 ± 10%	ac or dc volts
Current	0.175	0.35	amp

Direct Interelectrode Capacitances (Approx.):°

	Unit No. 1	*Unit No. 2*	
Grid to plate	1.5	1.5	μμf
Grid to cathode and heater. .	1.6	1.6	μμf
Plate to cathode and heater .	0.5	0.4	μμf

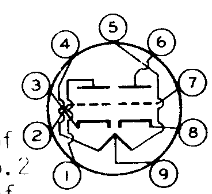
Characteristics, Class A_1 Amplifier (Each Unit):

Plate Voltage	100	250	volts
Grid Voltage.	0	-8.5	volts
Amplification Factor.	19.5	17	
Plate Resistance (Approx.). . .	6250	7700	ohms
Transconductance.	3100	2200	μmhos
Plate Current	11.8	10.5	ma
Grid Voltage (Approx.) for plate current of 10 μamp. . .	-	-22	volts

Mechanical:

Mounting Position . . . . Any
Maximum Overall Length. . . . . 2-3/16"
Maximum Seated Length . . . . 1-15/16"
Length, Base Seat to Bulb Top (Excluding tip) 1-9/16" ± 3/32"
Maximum Diameter. . . . . 7/8"
Dimensional Outline . . . . *See General Section*
Bulb. T-6-1/2
Base. . . . . .Small-Button Noval 9-Pin (JETEC No. E9-1)
Basing Designation for BOTTOM VIEW. 9A

Pin 1 - Plate of Unit No. 2
Pin 2 - Grid of Unit No. 2
Pin 3 - Cathode of Unit No. 2
Pins 4 & 9 - Heater of Unit No. 2
Pins 5 & 9 - Heater of Unit No. 1



Pin 6 - Plate of Unit No. 1
Pin 7 - Grid of Unit No. 1
Pin 8 - Cathode of Unit No. 1
Pin 9 - Heater Mid-Tap

AMPLIFIER - Class A_1

Values are for Each Unit

Maximum Ratings, *Absolute Values:*

PLATE VOLTAGE . . . . 330 max. volts

° Without external shield.

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CATHODE CURRENT	22 max.	ma
PLATE DISSIPATION	3 max.	watts
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	100 max.	volts
Heater positive with respect to cathode.	100 max.	volts
BULB TEMPERATURE (At hottest point on bulb surface).	165 max.	°C

Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED AMPLIFIER CHART at end of tabulated data for this type

Maximum Circuit Values:

Grid-Circuit Resistance:		
For fixed-bias operation.	0.25 max.	megohm
For cathode-bias operation.	1.0 max.	megohm

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN•

Values are for Each Unit and are Initial, Unless Otherwise Specified

	Note	*Min.*	*Max.*	
Heater Current	1	0.160	0.190	amp
Direct Interelectrode Capacitances:				
Grid to plate	2	1.2	1.8	μμf
Grid to cathode and heater	2	1.25	1.95	μμf
Plate to cathode and heater (Unit No.1)	2	0.3	0.7	μμf
Plate to cathode and heater (Unit No.2)	2	0.2	0.6	μμf
Amplification Factor	1,3	15.5	18.5	
Plate Current (1)	1,3	6.5	14.5	ma
Plate-Current Difference Between Units	1,3	-	3.5	ma
Plate Current (2)	1,4	-	20	μamp
Transconductance (1)	1,3	1750	2650	μmhos
Transconductance (2)	1,5	2500	3700	μmhos
Transconductance (2) at 500 hours	1,5	2000	3700	μmhos
Transconductance (3)	5,6	2250	-	μmhos
Transconductance Change: Difference between average transconductance (2) initially, and average after 500 hours, expressed as a percentage of the initial average	1,5	-	15	%

•, Notes 1 to 6: See next page.

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	Note	Min.	Max.	
Reverse Grid Current.	1,7	–	0.5	µamp
Grid Emission Current	8,9	–	1.5	µamp
Heater-Cathode Leakage Current:				
Heater negative with respect to cathode.	1,10	–	10	µamp
Heater positive with respect to cathode.	1,10	–	10	µamp
Leakage Resistance:				
Between grid and all other electrodes tied together	1,11	–	500	megohms
Between plate and all other electrodes tied together	1,12	–	500	megohms
Leakage Resistance at 500 hours:				
Between grid and all other electrodes tied together	1,11	–	250	megohms
Between plate and all other electrodes tied together	1,12	–	250	megohms

Note 1: With 12.6 volts ac or dc on heater (series connection).

Note 2: Without external shield and with unit not under test connected to ground.

Note 3: With dc plate volts = 250, and dc grid volts = -8.5. Each unit tested separately. Unit not under test connected to ground.

Note 4: With dc plate-supply volts = 250, plate load resistance (megohms) = 0.5, and dc grid volts = -30. Each unit tested separately. Unit not under test connected to ground.

Note 5: With dc plate volts = 100, and dc grid volts = 0. Each unit tested separately. Unit not under test connected to ground.

Note 6: With 11.0 volts ac or dc on heater (series connection).

Note 7: With dc plate volts = 250, grid-circuit resistance (megohms) = 0.5, and dc grid volts = -8.5. Each unit tested separately. Unit not under test connected to ground.

Note 8: With 15.0 volts ac or dc on heater (series connection).

Note 9: With dc plate volts = 250, grid-circuit resistance (megohms) = 0.5, and dc grid volts = -30. Each unit tested separately. Unit not under test connected to ground.

Note 10: With 100 volts dc between heater and cathode and units connected in parallel.

Note 11: With grid 100 volts negative with respect to all other electrodes tied together.

Note 12: With plate 300 volts negative with respect to all other electrodes tied together.

● Each tube is stabilized before characteristics testing by continuous operation for at least 45 hours at room temperature and with dissipation values equivalent to life test conditions.

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SPECIAL RATINGS & PERFORMANCE DATA

Shock Rating:

Impact Acceleration . . . . 600 max. g

This test is performed on a sample lot of tubes from each production run in a Navy Type, High-Impact (flyweight) Shock Machine. Tubes are held rigid in four different positions and are subjected to 20 blows at the specified maximum impact acceleration. At the end of this test, tubes will not show permanent or temporary shorts or open circuits, and are required to meet established limits for vibrational acceleration, heater-cathode leakage current, and transconductance.

Fatigue Rating:

Vibrational Acceleration . . . . 2.5 max. g

This test is performed on a sample lot of tubes from each production run. Tubes are rigidly mounted and subjected in each of three positions to 2.5 g vibrational acceleration at 25 cycles per second for 32 hours. At the end of this test, tubes will not show permanent or temporary shorts or open circuits, and are required to meet established limits for impact acceleration, heater-cathode leakage current, and transconductance (I).

Low-Frequency Vibration Performance:

RMS Output Voltage . . . . 100 max. mv

This test is performed on a sample lot of tubes from each production run under the following conditions: plate of unit No.1 tied to plate of unit No.2, grid of unit No. 1 tied to grid of unit No.2, heater volts = 12.6, dc plate volts = 250, dc grid volts = −8.5, plate load resistance (ohms) = 2000, and vibrational acceleration of 2.5 g at 25 cycles per second.

Heater-Cycling Life Performance:

Cycles of Intermittent Operation . . . . 2000 min. cycles

Under the following conditions and with the heaters of unit No.1 and unit No.2 connected in parallel: heater volts = 7.5 cycled one minute on and one minute off, heater 135 volts positive with respect to cathode, and plate and grid volts = 0.

Audio-Frequency Noise and Microphonic Performance:

RMS Output Voltage . . . . 100 max. mv

This test is performed on a sample lot of tubes from each production run under the following conditions: plate of unit No.1 tied to plate of unit No.2, grid of unit No.1 tied to grid of unit No.2, dc heater volts = 12.6, plate-supply volts = 300, cathode resistor (ohms) = 1500 common to both units, and plate load resistance (ohms) = 50,000.

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Shorts and Continuity Test:

This test is performed on a sample lot of tubes from each production run. In this test, a tube is considered inoperative if it shows a permanent or temporary short or open circuit, or a value of reverse grid current in excess of 1.0 microampere under the conditions specified in the CHARACTERISTICS RANGE VALUES for reverse grid current.

1-Hour Stability Life Performance:

This test is performed on a sample lot of tubes from each production run to insure that the tubes have been properly stabilized. With both units operating, each unit is checked for variation in transconductance (1) under conditions of maximum rated plate dissipation. At the end of 1 hour, the value of transconductance is read. The variation in transconductance from the 0-hour reading will not exceed 10 per cent.

100-Hour Life Performance:

This test is performed on a sample lot of tubes from each production run under the conditions of maximum rated plate dissipation to insure a low percentage of early inoperatives. At the end of 100 hours a tube is considered inoperative if it shows a permanent or temporary short or open circuit, or a value of reverse grid current in excess of 1.0 microampere under the conditions specified in CHARACTERISTICS RANGE VALUES for reverse grid current.

500-Hour Average Life Performance:

This 500-hour test is made on a sample lot of tubes from each production run to insure high quality of the individual tube and to guard against epidemic failures of any of the characteristics indicated below. With both units operating, each unit is life tested separately at room temperature under the following conditions: heater volts = 12.6 ac or dc (series connection), plate volts = 250, grid volts = -8.5, grid-circuit resistance (megohms) = 0.5, heater 135 volts positive with respect to cathode, and bulb temperature (°C) = 165. At the end of 500 hours, tube will not show permanent shorts or open circuits and will be criticized for the total number of defects in the sample lot and for the number of tubes failing to pass the established initial limits for heater current, reverse grid current, heater-cathode leakage current, and 500-hour limits for transconductance (2), transconductance change, and leakage resistance are shown under CHARACTERISTICS RANGE VALUES.

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OPERATING CONDITIONS AS RESISTANCE-COUPLED AMPLIFIER (Each Unit)

Plate-Supply Voltage		90		volts
Plate Load Resistor	0.1	0.24	0.51	megohm
Grid Resistor (Of following stage)	0.24	0.51	1	megohm
Cathode Resistor	3400	9400	22000	ohms
Peak Output Voltage	16	19	20	volts
Voltage Gain▲	12	12	12	
Plate-Supply Voltage		180		volts
Plate Load Resistor	0.1	0.24	0.51	megohm
Grid Resistor (Of following stage)	0.24	0.51	1	megohm
Cathode Resistor	2800	8400	20000	ohms
Peak Output Voltage	32	37	42	volts
Voltage Gain▲	13	13	13	
Plate-Supply Voltage		300		volts
Plate Load Resistor	0.1	0.24	0.51	megohm
Grid Resistor (Of following stage)	0.24	0.51	1	megohm
Cathode Resistor	2600	7000	18000	ohms
Peak Output Voltage	44	52	58	volts
Voltage Gain▲	14	13	13	

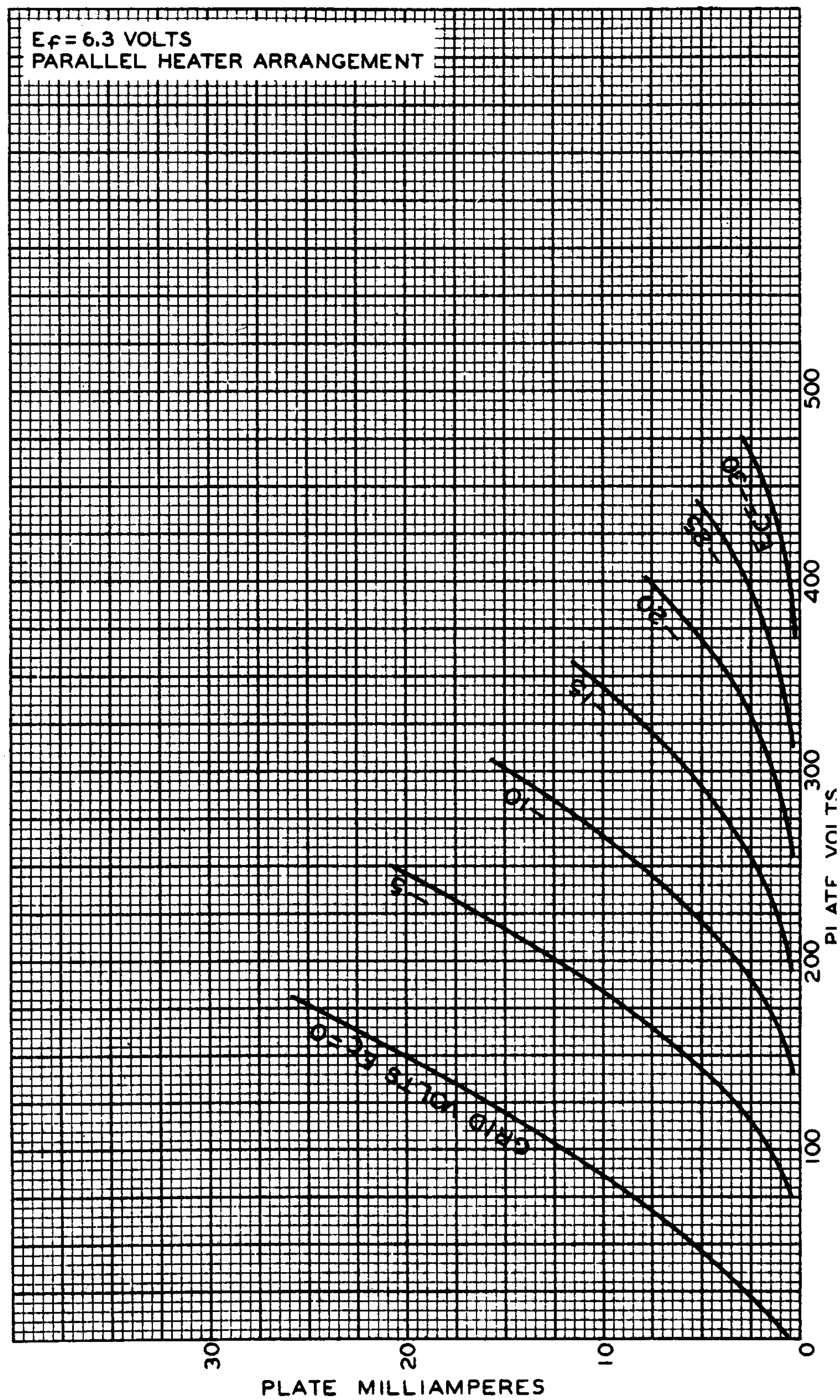
▲ At 2 volts (rms) output.

Note: Coupling capacitors should be selected to give desired frequency response. Cathode resistors should be adequately bypassed.

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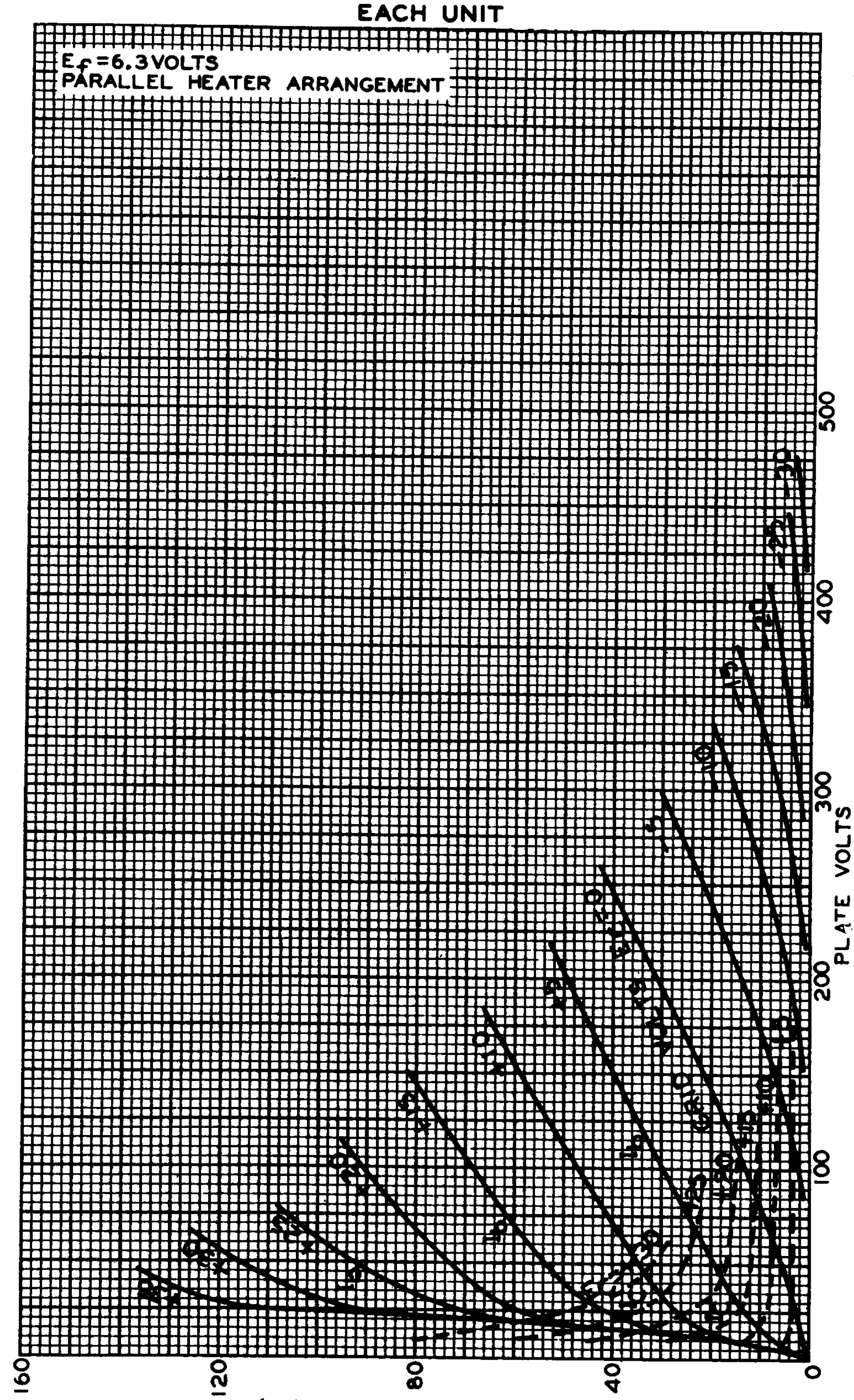
AVERAGE PLATE CHARACTERISTICS
EACH UNIT



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92CM-7939

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AVERAGE CHARACTERISTICS
EACH UNIT

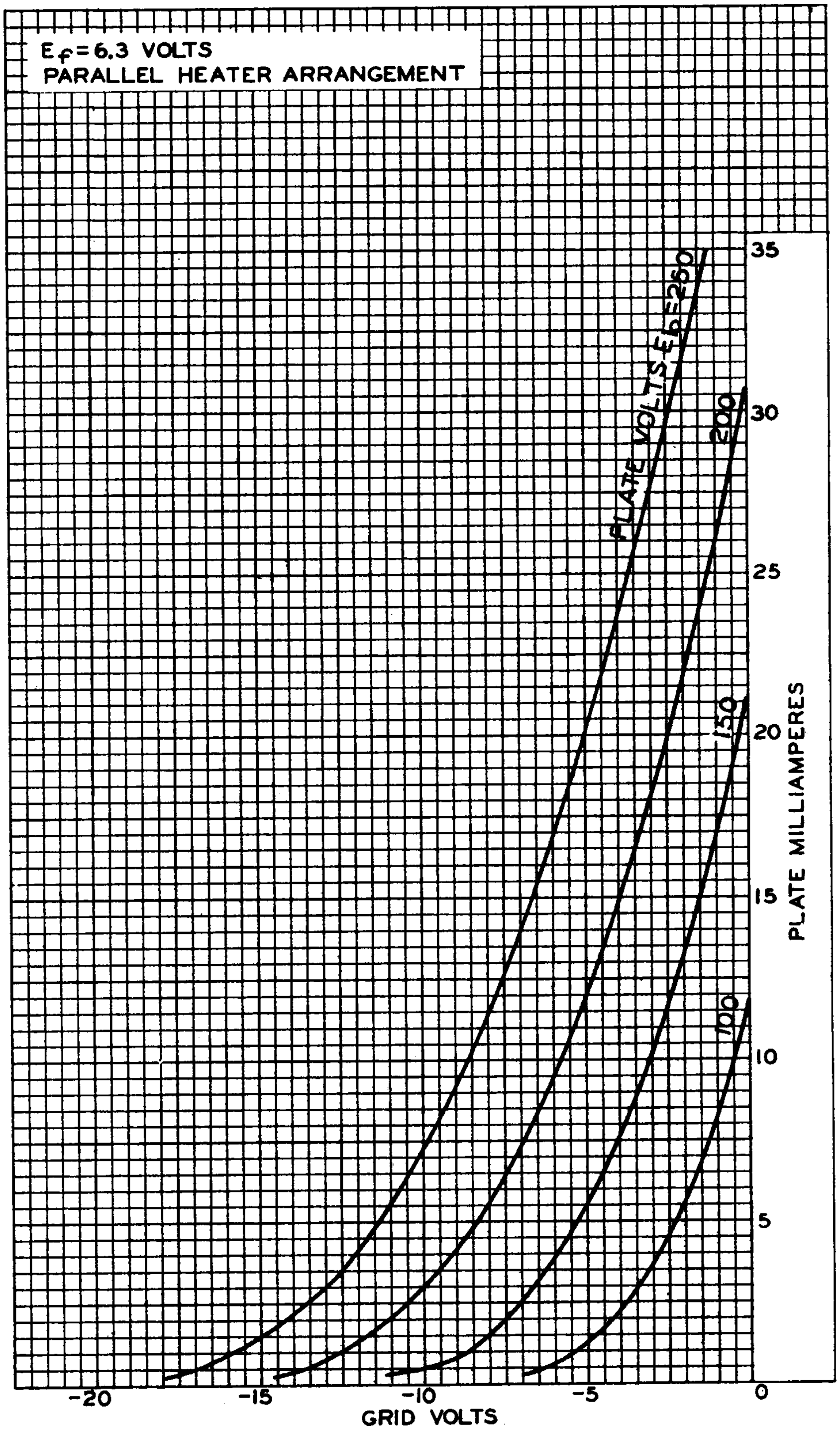


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92CM-7938R1

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AVERAGE CHARACTERISTICS
EACH UNIT

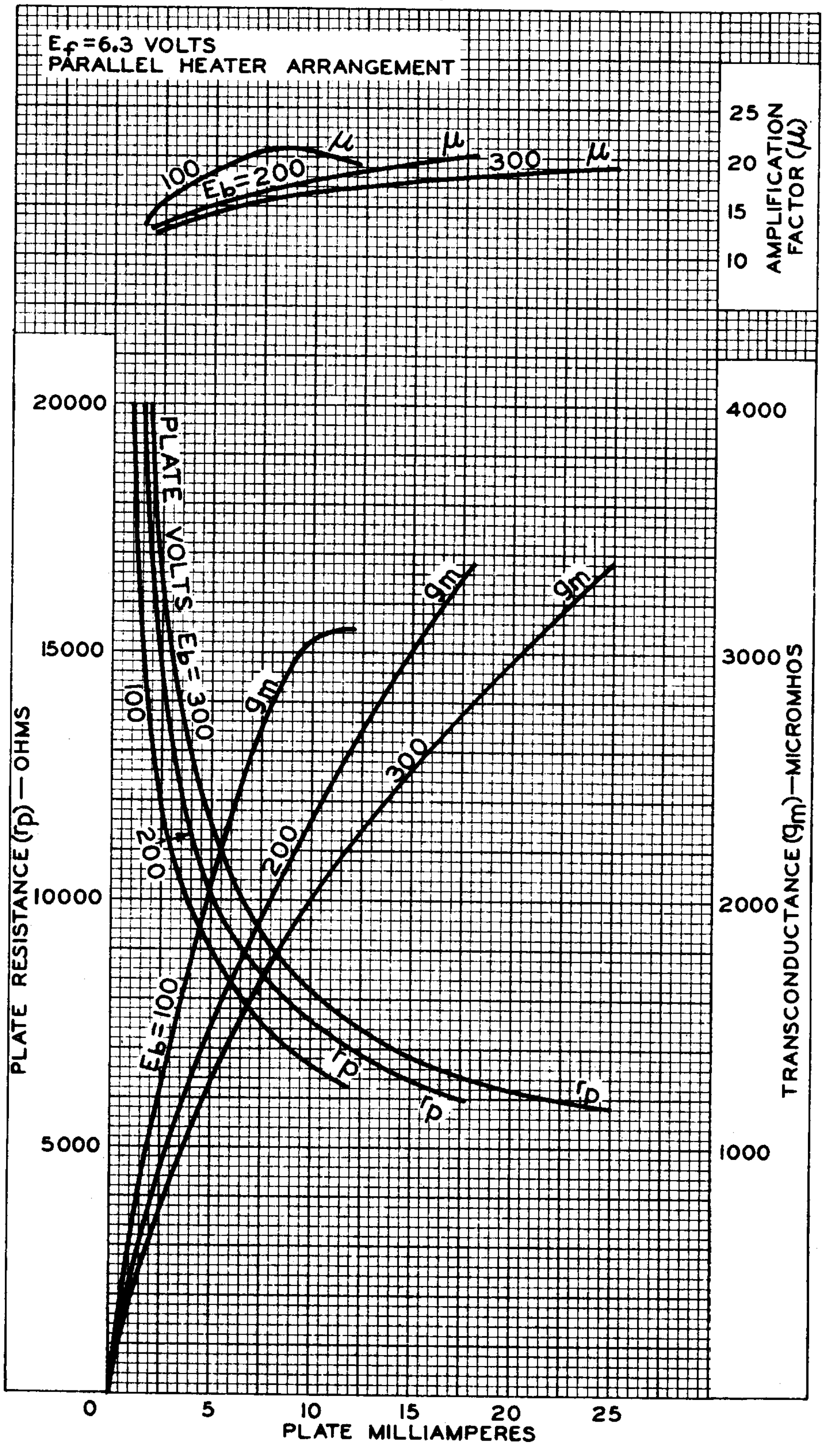


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92CM-9097

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AVERAGE CHARACTERISTICS
EACH UNIT



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92CM-9096